

## ABSTRACT OF THE DISCLOSURE

The present invention describes a G-protein coupled receptor (GPCR) family member newly identified as being modified, e.g., phosphorylated, and associated with tyrosine phosphorylated activation complexes, following exposure of cells to smoke from tobacco burning substances, namely, cigarette smoke. This GPCR protein is RAI-3, which was first found to be phosphorylated in cells treated with cigarette smoke and to be associated with other proteins activated in cigarette smoke treated cells by virtue of the present invention. Because cigarette smoke is considered to be a major causative factor of chronic obstructive pulmonary disease (COPD) and disorders and conditions related thereto, the RAI-3 protein is newly provided as a cellular drug target for screening, discovering, and identifying modulators for the treatment and/or prevention of COPD and its related disorders and conditions, such as emphysema and chronic bronchitis. In accordance with the present invention RAI-3 modulators, e.g., agonists and antagonists, can be used as therapeutics in the treatment of COPD and numerous other diseases and disorders that are associated with regulation of NF- $\kappa$ B and/or its associated or interacting signaling molecules. This invention further provides SNPs of RAI-3, e.g., for determining COPD association in individuals.